2014 CAMRT Research Grant Program Final Report

Liz Lorusso & Lyndsay FitzGeorge

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Executive Summary

Examining Practitioners’ Assessments of Perceived Aesthetic and Diagnostic Quality of High kVp–Low mAs Pelvis, Chest, Skull, and Hand Phantom Radiographs

The importance of regularly investigating dose optimization strategies for general radiographic examinations is critical to ensure that practitioners are delivering a dose to patients that is ‘‘as low as reasonably achievable’’ (i.e., the ALARA principle). This study investigated the usefulness of the dose optimization strategy of increased tube voltage (kVp) and decreased tube current-exposure time product (mAs) (or high kVp–low mAs) by examining practitioners’ assessments of perceived aesthetic and diagnostic quality of direct digital radiographs acquired using this strategy. Ninety-one practitioners (radiologists, radiology residents, radiographers, and radiography students) from eight clinical sites in Ontario examined three types of radiographs (i.e., a ‘‘standard’’ image, +20 kVp image, and +30 kVp image) for anthropomorphic pelvis, chest, skull, and hand phantoms and rated (on a five-point scale) each image in regard to its perceived aesthetic quality, perceived diagnostic quality, and visualization of anatomic structures. Our primary findings are that for the pelvis, skull, and hand—although not the chest—images acquired using standard technical factors were rated significantly higher in diagnostic and aesthetic quality than those acquired using the high kVp–low mAs strategy. Despite this, both standard and dose-optimized images of the pelvis, skull, and hand were rated to be of acceptable diagnostic quality for clinical use, which is the relevant factor when determining how to best adhere to the ALARA principle. Thus, this reinforces the importance of not conflating the frivolous question of aesthetic quality with the relevant clinical question of diagnostic quality. In conclusion, for the pelvis, skull, and hand, an increase of 20 kVp was an effective strategy to reduce dose while still acquiring images of diagnostic quality in this study.

Project Completion Report

Summary of Expenditures

<table>
<thead>
<tr>
<th>Research Personnel</th>
<th>Hours Per Week</th>
<th>Total Project Hours</th>
<th>Wage Per Hour</th>
<th>Total Amount</th>
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</thead>
<tbody>
<tr>
<td>Research Assistant</td>
<td>15 hours per week (4 month period)</td>
<td>180 hours</td>
<td>$25/hour</td>
<td>$4500</td>
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<table>
<thead>
<tr>
<th>Dissemination of Results at Conferences</th>
<th>Conference Name and Date</th>
<th>Materials</th>
<th>Travel</th>
<th>Other</th>
<th>Total Amount</th>
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<tbody>
<tr>
<td>CAMRT Annual General Meeting, May 27-30, 2014</td>
<td>N/A</td>
<td>N/A</td>
<td>Registration - $500</td>
<td>$500</td>
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Total = $5000

List of Research Dissemination Activities

Scholarly Presentations

Practitioner Presentations
- Lorusso, E. (November 2-8, 2012). MRT Week. (Oral Presentations)
  - St. Joseph’s Hospital, London, ON.
  - University Hospital – London Health Sciences Centre, London, ON.
  - Tillsonburg Hospital, Tillsonburg, ON.
  - Huron Perth Health Care Alliance, Stratford, ON.

Non-Peer Reviewed Publications


**Peer-Reviewed Publication**


**Final Publication**

Please find a PDF of the final publication attached to this report. Citation is as follows: